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Inkjet printing system for producing borderless image on print media includes first absorber extending beyond the first edge of the print media and absorb, and second absorber contacting and absorbing the waste ink from the first absorber

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US 20040125154	A1	20040701	US 2002330344	A	20021227	200450	
US 6860583	B2	20050301	US 2002330344	A	20021227	200516	

Priority Applications (No Type Date): US 2002330344 A 20021227
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Abstract (Basic): EP 1433612 A1

NOVELTY - An inkjet printing system includes first and second absorbers formed in the platen within the print zone. The first absorber, in use, extends beyond the first edge of the print media and absorb. The second absorber, in use, contacts and absorbs the waste ink from the first absorber. A second capillary head of the second absorber is greater than the first capillary head of the first absorber.

DETAILED DESCRIPTION - An inkjet printing system includes platen for supporting print media, printhead, first absorber, and second absorber. The printhead ejects ink into a print zone between the printhead and the platen toward the print media and beyond a first edge of the print media to generate waste ink. The first absorber is formed in the platen within the print zone. The first absorber, in use, extends beyond the first edge of the print media and absorb. The waste ink ejected beyond the first edge of the print media. The second absorber in use contacting and absorbing the waste ink from the first absorber, where the first absorber has a first capillary head and the second absorber have a second capillary head greater than the first capillary head. An INDEPENDENT CLAIM is also included for a method of printing on a print media, including supporting the print media with a platen (28); ejecting ink from a printhead (12) into a print zone (29) between the printhead and the platen towards the print media, including ejecting ink beyond a first edge of the print media and generating waste ink; absorbing the waste ink with a first absorber (32) formed in

the platen within the print zone and extended beyond the first edge of the print media; and absorbing the waste ink from the first absorber with a second absorber (34) contacting the first absorber.

USE - For producing a borderless image on the print media.

ADVANTAGE - The inventive inkjet printing system reduces the possibility of waste ink negatively affecting the quality of images produced with inkjet printing system. It has increased waste ink storage capacity. It allows the transport and storage of waste ink vertically and/or horizontally away from print zone to an area where additional waste ink storage capacity is available.

DESCRIPTION OF DRAWING(S) - The drawing shows a block diagram of the inventive inkjet printing system.

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Title Terms: PRINT; SYSTEM; PRODUCE; BORDER; IMAGE; PRINT; MEDIUM; FIRST; ABSORB; EXTEND; FIRST; EDGE; PRINT; MEDIUM; ABSORB; SECOND; ABSORB; CONTACT; ABSORB; WASTE; INK; FIRST; ABSORB

Derwent Class: A97; G05; P75; T04

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(54) Ink jet printing

(57) An inkjet printing system (10) includes a platen (28) adapted to support a print media (19), a printhead (12) adapted to eject ink into a print zone (29) between the printhead and the platen toward the print media and beyond a first edge of the print media to generate waste ink, a first absorber (32) formed in the platen within the print zone such that the first absorber is adapted to extend beyond the first edge of the print media and absorb the waste ink ejected beyond the first edge of the print media, and a second absorber (34) adapted to contact and absorb the waste ink from the first absorber, wherein the first absorber has a first capillary head and the second absorber has a second capillary head greater than the first capillary head.

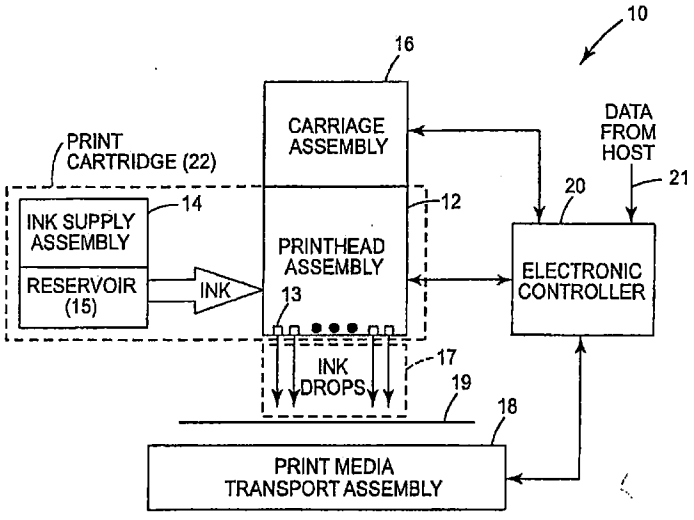

Fig. 1

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Description

[0001] The present invention relates to an inkjet printing system and method and to a waste ink absorption system.

[0002] An inkjet printing system may include a printhead and an ink supply which supplies liquid ink to the printhead. The printhead ejects ink drops through a plurality of orifices or nozzles and toward a print media, such as a sheet of paper, so as to print onto the print media. Typically, the orifices are arranged in one or more arrays such that properly sequenced ejection of ink from the orifices causes characters or other images to be printed upon the print media as the printhead and the print media are moved relative to each other.

[0003] In one arrangement, the inkjet printing system produces a borderless image on the print media. More specifically, the inkjet printing system produces an image on the print media without one or more unprinted margins between the image and a corresponding edge of the print media. An example of such an image includes a photograph. Examples of such a borderless inkjet printing system include the HP Photosmart 100 series printer produced by Hewlett-Packard Company of Palo Alto, California, assignee of the present invention, and the Epson Stylus Photo 820 printer produced by Seiko Epson Corporation.

[0004] Typically, the borderless inkjet printing system produces a borderless image on the print media by ejecting ink drops beyond one or more edges of the print media. As such, overspray or waste ink is generated by the ink drops which are deposited beyond the edges of the print media. Unfortunately, this overspray or waste ink can be transferred to print media subsequently fed through the inkjet printing system and, therefore, negatively affect the quality of images produced with the inkjet printing system.

[0005] The present invention seeks to provide an improved printing system and method.

[0006] According to an aspect of the present invention, there is provided an inkjet printing system as specified in claim 1.

[0007] According to another aspect of the present invention, there is provided a method of printing as specified in claim 10.

[0008] According to another aspect of the present invention, there is provided a waste ink absorption system as specified in claim 14.

[0009] A preferred inkjet printing system includes a platen adapted to support a print media, a printhead adapted to eject ink into a print zone between the printhead and the platen toward the print media and beyond a first edge of the print media to generate waste ink, a first absorber formed in the platen within the print zone such that the first absorber is adapted to extend beyond the first edge of the print media and absorb the waste ink ejected beyond the first edge of the print media, and a second absorber adapted to contact and absorb the waste ink from the first absorber, wherein the first absorber has a first capillary head and the second absorber has a second capillary head greater than the first capillary head.

[0010] Embodiments of the present invention are described below, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a block diagram illustrating one embodiment of an inkjet printing system according to the present invention.

Figure 2 is a schematic side view illustrating one embodiment of a portion of a print media transport assembly and a print cartridge according to the present invention.

Figure 3 is a perspective view illustrating a portion of an inkjet printing system including one embodiment of a waste ink absorption system according to the present invention.

Figure 4 is an exploded perspective view of the waste ink absorption system of Figure 3.

[0011] In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. In this regard, directional terminology, such as "top," "bottom," "front," "back," "leading," "trailing," etc., is used with reference to the orientation of the Figure(s) being described. Because components of the can be positioned in a number of different orientations, the directional terminology is used for purposes of illustration and is in no way limiting. It is to be understood that other embodiments may be utilized and structural or logical changes may be made without departing from the scope of the claims.

[0012] Figure 1 illustrates one embodiment of a portion of an inkjet printing system 10. Inkjet printing system 10 includes an inkjet printhead assembly 12, an ink supply assembly 14, a carriage assembly 16, a print media transport assembly 18, and an electronic controller 20. Inkjet printhead assembly 12 includes one or more printheads which eject drops of one or more colored inks through a plurality of orifices or nozzles 13. In one embodiment, a plurality of printheads are spaced apart and staggered such that adjacent printheads overlap. Thus, inkjet printhead assembly 12 may span a nominal page width or a width shorter or longer than nominal page width.

[0013] In one embodiment, the drops of ink are directed toward a medium, such as a print media 19, so as to print onto print media 19. Print media 19 includes any type of suitable sheet material, such as paper, card stock, envelopes, labels, transparencies, Mylar, and the like. Typically, nozzles 13 are arranged in one or more columns or arrays such that properly sequenced ejection of ink from nozzles 13 causes characters, symbols, and/or other graphics or images to be printed upon print

media 19 as inkjet printhead assembly 12 and print media 19 are moved relative to each other.

[0014] Ink supply assembly 14 supplies ink to inkjet printhead assembly 12 and includes a reservoir 15 for storing ink. As such, in one embodiment, ink flows from reservoir 15 to inkjet printhead assembly 12. In one embodiment, inkjet printhead assembly 12 and ink supply assembly 14 are housed together in an inkjet print cartridge or pen, as identified by dashed line 22. In another embodiment, ink supply assembly 14 is separate from inkjet printhead assembly 12 and supplies ink to inkjet printhead assembly 12 through an interface connection, such as a supply tube.

[0015] Carriage assembly 16 positions inkjet printhead assembly 12 relative to print media transport assembly 18, and print media transport assembly 18 positions print media 19 relative to inkjet printhead assembly 12. As such, a print region 17 within which inkjet printhead assembly 12 deposits ink drops is defined adjacent to nozzles 13 in an area between inkjet printhead assembly 12 and print media 19. Print media 19 is advanced through print region 17 during printing by print media transport assembly 18.

[0016] Carriage assembly 16 typically includes a carriage and a carriage drive assembly. As such, inkjet printhead assembly 12 is removably mounted in, and supported by, the carriage, and the carriage drive assembly moves the carriage and, therefore, inkjet printhead assembly 12 relative to print media 19. A conventional carriage drive assembly may include a carriage guide which supports the carriage, a drive motor, and a belt and pulley system which moves the carriage along the carriage guide.

[0017] In one embodiment, inkjet printhead assembly 12 is a scanning type printhead assembly, and carriage assembly 16 moves inkjet printhead assembly 12 relative to print media transport assembly 18 and print media 19 during printing of a swath on print media 19. In another embodiment, inkjet printhead assembly 12 is a non-scanning type printhead assembly, and carriage assembly 16 fixes inkjet printhead assembly 12 at a prescribed position relative to print media transport assembly 18 during printing of a swath on print media 19 as print media transport assembly 18 advances print media 19 past the prescribed position.

[0018] Electronic controller 20 communicates with inkjet printhead assembly 12, carriage assembly 16, and print media transport assembly 18. Electronic controller 20 receives data 21 from a host system, such as a computer, and includes memory for temporarily storing data 21. Typically, data 21 is sent to inkjet printing system 10 along an electronic, infrared, optical or other information transfer path. Data 21 represents, for example, a document and/or photo to be printed. As such, data 21 forms a print job for inkjet printing system 10 and includes one or more print job commands and/or command parameters.

[0019] In one embodiment, electronic controller 20 provides control of inkjet printhead assembly 12 including timing control for ejection of ink drops from nozzles 13. As such, electronic controller 20 defines a pattern of ejected ink drops which form characters, symbols, and/or other graphics or images on print media 19. Timing control and, therefore, the pattern of ejected ink drops, is determined by the print job commands and/or command parameters. In one embodiment, logic and drive circuitry forming a portion of electronic controller 20 is located on inkjet printhead assembly 12. In another embodiment, logic and drive circuitry is located off inkjet printhead assembly 12.

[0020] Figure 2 illustrates one embodiment of a portion of print media transport assembly 18 and print cartridge 22, including inkjet printhead assembly 12. Print media transport assembly 18 includes a drive roller 24, a pinch roller 26, and a platen 28. Drive roller 24 is rotatably mounted for rotation and driven in a direction indicated by arrow 25. Pinch roller 26 is mounted in an opposing relationship to drive roller 24 such that a nip is formed between drive roller 24 and pinch roller 26. Platen 28 supports print media 19 as print media 19 is advanced through print region 17, as described below. During printing, print media 19 is advanced relative to inkjet printhead assembly 12 in a direction indicated by arrow 191.

[0021] Drive roller 24 and pinch roller 26 work in conjunction to advance print media 19 through print region 17. In one embodiment, print media 19 is fed into engagement between drive roller 24 and pinch roller 26 by a pick roller or other print media transport roller (not shown), as is well known in the art.

[0022] In a scanning type embodiment, once a desired portion of print media 19 reaches print region 17, print media 19 is held in position as print cartridge 22, including inkjet printhead assembly 12, traverses print media 19 in a direction substantially perpendicular to the direction of print media advance indicated by arrow 191 (i.e., in a direction in and out of the plane of the paper) to print on print media 19 and create a print swath on print media 19. Once print cartridge 22 has completed the print swath, print media 19 is advanced an incremental distance in the direction of print media advance indicated by arrow 191 to permit further printing on print media 19 and the creation of an additional print swath on print media 19. In one embodiment, print media 19 is supported by platen 28 as inkjet printhead assembly 12 prints on print media 19.

[0023] In a non-scanning type embodiment, inkjet printhead assembly 12 is held in a prescribed position relative to platen 28 as print media 19 is supported by platen 28 and advanced in the direction of print media advance indicated by arrow 191 to print on print media 19.

[0024] It is understood that Figure 2 is a simplified schematic illustration of print media transport assembly 18. For example, the relative size and spacing of drive roller 24 and pinch roller 26 may vary.

[0025] In addition, an orientation of the opposing relationship of pinch roller 26 to drive roller 24 may vary. More specifically, a center of pinch roller 26 need not be directly above drive roller 24. Furthermore, multiple drive rollers 24 and/or multiple pinch rollers 26 each spaced in a direction substantially perpendicular to the direction of print media advance indicated by arrow 191 (i.e., in a direction in and out of the plane of the paper) may form print media transport assembly 18. In addition, the spacing between inkjet printhead assembly 12 and print media 19 has been exaggerated for clarity of the invention. Furthermore, it is understood that print media 19 contacts and is supported by platen 28.

[0026] In one embodiment, inkjet printing system 10 produces a borderless image on print media 19. More specifically, inkjet printing system 10 produces an image on print media 19 without one or more unprinted margins between the image and a corresponding edge of print media 19. An example of such an image includes a photograph.

[0027] As illustrated in the embodiments of Figures 2 and 3, inkjet printhead assembly 12 prints beyond one or more edges of print media 19 to produce a borderless image on print media 19. As such, when printing at or near the edges of print media 19, print region 17 extends beyond one or more edges of print media 19 between inkjet printhead assembly 12 and platen 28.

[0028] In one embodiment, as illustrated in Figure 3, inkjet printhead assembly 12 prints beyond two opposing edges 192 and 193 of print media 19 and at least one edge 194 of print media 19 which is adjacent to opposing edges 192 and 193. Thus, a print zone 29 extends between inkjet printhead assembly 12 and platen 28 and across platen 28 so as to encompass all possible print regions of inkjet printhead assembly 12. Print zone 29, therefore, is defined to include that area into which inkjet printhead assembly 12 deposits ink drops during printing.

[0029] In one embodiment, as illustrated in Figures 3 and 4, inkjet printing system 10 includes a waste ink absorption system 30. As inkjet printing system 10 produces a borderless image on print media 19, overspray or waste ink is generated by ink drops ejected from inkjet printhead assembly 12 beyond the edges of print media 19. As such, waste ink absorption system 30 collects the waste ink.

[0030] As illustrated in the embodiment of Figures 3 and 4, waste ink absorption system 30 includes a print area absorber 32, at least one wick 34, and a storage reservoir 36. In one embodiment, print area absorber 32 is formed in a channel 281 of platen 28 and positioned within print zone 29. As such, print area absorber 32 collects overspray or waste ink generated during printing, as described above. Wick 34 extends through a hole 282 of platen 28 and contacts print area absorber 32. Wick 34 extends between print area absorber 32 and storage reservoir 36 so as to transfer the waste ink collected by print area absorber 32 to storage reservoir 36. As such, storage reservoir 36 accumulates and stores the waste ink collected by print area absorber 32. Storage reservoir 36, therefore, accumulates and stores the waste ink remote of print zone 29. Thus, print area absorber 32 forms a first absorber for waste ink, wick 34 forms a second absorber for waste ink, and storage reservoir 36 forms a third absorber for waste ink. As described below, print area absorber 32, wick 34, and storage reservoir 36 cooperate to transport the waste ink away from print zone 29.

[0031] In one embodiment, as illustrated in Figure 4, print area absorber 32 has a hole 321 formed therein into which a first end 341 of wick 34 is inserted. Hole 321 is sized so as to ensure contact between print area absorber 32 and wick 34 when wick 34 is inserted. In addition, storage reservoir 36 has a hole 361 formed therein into which a second end 342 of wick 34 opposite first end 341 is inserted. Hole 361 is sized so as to ensure contact between storage reservoir 36 and wick 34 when wick 34 is inserted.

[0032] In the embodiment illustrated in Figures 3 and 4, waste ink absorption system 30 includes a pair of spaced print area absorbers 32 each positioned in spaced portions of platen 28 and includes a pair of spaced wicks 34 each contacting and extending between a respective print area absorber 32 and storage reservoir 36. It is, however, within the scope of the claims for waste ink absorption system 30 to include a single print area absorber extending along platen 28 with one or more wicks 34 contacting and extending between print area absorber 32 and storage reservoir 36.

[0033] Waste ink absorption system 30 relies on capillary action to transport or draw the waste ink away from print zone 29. Capillary action refers to the movement of a fluid in the interstices of a porous medium due to capillary forces. The potential that causes the fluid to flow or move by capillary action is referred to as capillary head.

[0034] To transport the waste ink away from print zone 29 and into storage reservoir 36, print area absorber 32, wick 34, and storage reservoir 36 have differing capillary heads. More specifically, print area absorber 32 has a low capillary head relative to wick 34 and storage reservoir 36, wick 34 has a medium capillary head relative to print area absorber 32 and storage reservoir 36, and storage reservoir 36 has a high capillary head relative to print area absorber 32 and wick 34. As such, print area absorber 32 has a first capillary head, wick 34 has a second capillary head which is greater than the first capillary head of print area absorber 32, and storage reservoir 36 has a third capillary head which is greater than the second capillary head of wick 34. Thus, a differential capillary pressure is created between print area absorber 32 and storage reservoir 36. Accordingly, print area absorber 32 collects the waste ink, wick 34 pulls or draws the waste ink from print area absorber 32, and storage reservoir 36 pulls or draws the waste ink from wick 34.

[0035] In one embodiment, the differing capillary heads of print area absorber 32, wick 34, and storage reservoir 36 are established by selecting and/or utilizing differing materials and/or material characteristics for print area absorber 32, wick 34, and storage reservoir 36. For example, in one illustrative embodiment, print area absorber 32 is formed of a polyester needle felt material which has coarse fibers, wick 34 is formed of a porous plastic material, and storage reservoir 36 is formed of a polyester needle felt material which has fine fibers.

[0036] In one illustrative embodiment, a capillary head of the material of print area absorber 32, wick 34, and storage reservoir 36 is specified based on a respective test coupon of each material which is one-half inch wide by at least six inches tall and subjected to a test duration of two hours at ambient conditions with a composite ink. In one illustrative embodiment, a capillary head of the material of print area absorber 32 under the above test conditions is in a range of approximately 60 millimeters to approximately 80 millimeters. In another illustrative embodiment, the capillary head of the material of print area absorber 32 under the above test conditions is approximately 70 millimeters. In one illustrative embodiment, a capillary head of the material of wick 34 under the above test conditions is in a range of approximately 90 millimeters to approximately 110 millimeters. In another illustrative embodiment, the capillary head of the material of wick 34 under the above test conditions is approximately 100 millimeters. In one illustrative embodiment, a capillary head of the material of storage reservoir 36 under the above test conditions is at least approximately 120 millimeters. In another illustrative embodiment, the capillary head of the material of storage reservoir 36 under the above test conditions is approximately 140 millimeters.

[0037] By collecting the waste ink with print area absorber 32 and pulling or drawing the waste ink from print area absorber 32 with wick 34, the possibility of the waste ink negatively affecting the quality of images produced with inkjet printing system 10 by, for example, the transfer of the waste ink to print media 19 is reduced with waste ink absorption system 30. In addition, with waste ink absorption system 30, the waste ink storage capacity of inkjet printing system 10 is increased. More specifically, by transferring the waste ink from print area absorber 32 to storage reservoir 36, waste ink absorption system 30 allows the transport and storage of waste ink vertically and/or horizontally away from print zone 29 to an area where additional waste ink storage capacity is available. In one illustrative embodiment, a capacity of storage reservoir 36 is in a range of approximately three times to approximately five times greater than a capacity of print area absorber 32. In another illustrative embodiment, the capacity of storage reservoir 36 is approximately four times greater than that of print area absorber 32. As such, with waste ink absorption system 30, more printing can be completed before the absorbers are full of waste ink.

[0038] By transferring the waste ink from print area absorber 32 to storage reservoir 36, minimal space is required to collect the waste ink in print zone 29. Thus, print area absorber 32 can be designed with limited capacity so as to reduce the quantity of waste ink in print zone 29. Furthermore, by creating a differential capillary pressure between print area absorber 32 and storage reservoir 36, waste ink can be drawn from print area absorber 32 such that print area absorber 32 can be kept as dry as possible.

[0039] It will be appreciated by those of ordinary skill in the art that a wide variety of alternative and/or equivalent implementations calculated to achieve the same purposes may be substituted for the specific embodiments shown and described without departing from the scope of the claims.

[0040] The disclosures in United States patent application no. 10/330,344, from which this application claims priority, and in the abstract accompanying this application are incorporated herein by reference.

Claims

1. An inkjet printing system (10), including:

   a platen (28) operable to support a print media (19);
   a printhead (12) operable to eject ink into a print zone (29) between the printhead and the platen toward the print media and beyond a first edge of the print media to generate waste ink;
   a first absorber (32) formed in the platen within the print zone, the first absorber in use extending beyond the first edge of the print media and absorb the waste ink ejected beyond the first edge of the print media; and
   a second absorber (34) in use contacting and absorbing the waste ink from the first absorber,

   wherein the first absorber has a first capillary head and the second absorber has a second capillary head greater than the first capillary head.

2. A printing system as in claim 1, wherein the printhead is operable to eject ink beyond a second edge of the print media to generate the waste ink, and wherein the first absorber in use extends beyond the second edge of the print media and absorbs the waste ink ejected beyond the second edge of the print media.

3. A printing system as in claim 2, wherein the printhead is operable to eject ink beyond a third edge of the print media to generate the waste ink, and wherein the first absorber in use extends beyond the third edge of the print media and absorb the

waste ink ejected beyond the third edge of the print media.

4. A printing system as in any preceding claim, wherein the second absorber in use draws the waste ink from the first absorber.

5. A printing system as in any preceding claim, including:

a third absorber (36) in use contacting and absorbing the waste ink from the second absorber, wherein the third absorber has a third capillary head greater than the second capillary head.

6. A printing system as in claim 5, wherein the third absorber in use draws the waste ink from the second absorber.

7. A printing system as in claim 5, wherein the first absorber is designed to collect the waste ink, the second absorber is designed to transfer the waste ink from the first absorber to the third absorber, and the third absorber is designed to accumulate the waste ink.

8. A printing system as in claim 5, wherein the first absorber, the second absorber, and the third absorber are collectively operable to transport the waste ink away from the print zone.

9. A printing system as in any one of claims 5 to 8, wherein the capacity of the third absorber is in a range of approximately three times to approximately five times a capacity of the first absorber.

10. A method of printing on a print media (19), including the steps of:

supporting the print media with a platen (28);
ejecting ink from a printhead (12) into a print zone (29) between the printhead and the platen towards the print media, including ejecting ink beyond a first edge of the print media and generating waste ink;
absorbing the waste ink with a first absorber (32) formed in the platen within the print zone and extended beyond the first edge of the print media; and
absorbing the waste ink from the first absorber with a second absorber (34) contacting the first absorber,

wherein the first absorber has a first capillary head and the second absorber has a second capillary head greater than the first capillary head.

11. A method as in claim 10, including the step of:

absorbing the waste ink from the second absorber with a third absorber (36) contacting the second absorber, wherein the third absorber has a third capillary head greater than the second capillary head.

12. A method as in claim 11, wherein absorbing the waste ink with the first absorber, absorbing the waste ink from the first absorber with the second absorber, and absorbing the waste ink from the second absorber with the third absorber includes collecting the waste ink with the first absorber, transferring the waste ink from the first absorber to the third absorber with the second absorber, and accumulating the waste ink in the third absorber.

13. A method as in claim 11, wherein absorbing the waste ink with the first absorber, absorbing the waste ink from the first absorber with the second absorber, and absorbing the waste ink from the second absorber with the third absorber includes transporting the waste ink away from the print zone.

14. A waste ink absorption system (30) for an inkjet printing system (10), including:

a first absorber (32) having a first capillary head, the first absorber arranged to absorb waste ink generated within a print zone of the inkjet printing system;
a second absorber (34) having a second capillary head greater than the first capillary head, the second absorber being arranged to contact the first absorber and absorb the waste ink from the first absorber; and
a third absorber (36) having a third capillary head greater than the second capillary head, the third absorber being arranged to contact the second absorber and absorb the waste ink from the second absorber.

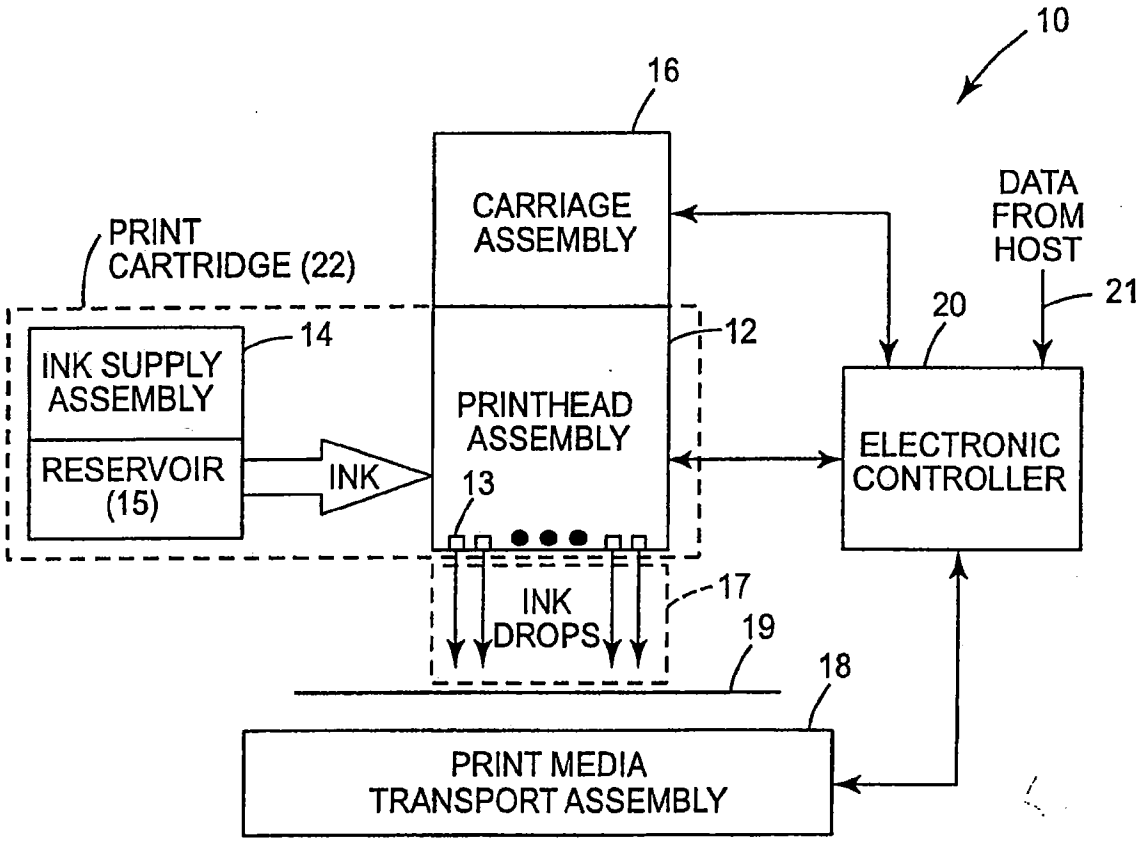
15. A system as in claim 14, wherein the first absorber is arranged to absorb the waste ink during printing.

16. A system as in claim 14 or 15, wherein the first absorber is positioned within the print zone of the inkjet printing system.

17. A system of claim 14, 15 or 16, wherein the first absorber includes a polyester needle felt material having coarse fibres, the second absorber includes a porous plastic material, and the third absorber includes a polyester needle felt material having fine fibers.

18. A system as in any one of claims 14 to 18, wherein,

based on a 1.2 cm (one-half inch) wide by at least 15 cm (six inch) tall sample, the first capillary head of the first absorber is in a range of approximately 60 millimetres to approximately 80 millimetres, the second capillary head of the second absorber is in a range of approximately 90 millimetres to approximately 110 millimetres, and the third capillary head of the third absorber is at least approximately 120 millimetres.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CARRIAGE ASSEMBLY
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INK
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INK DROPS
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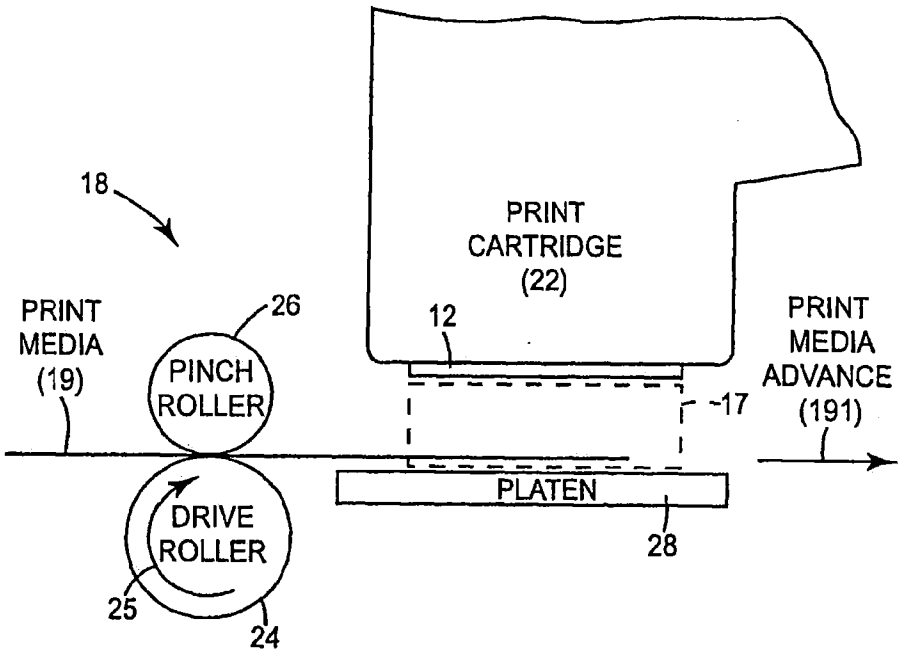
18
PRINT MEDIA TRANSPORT ASSEMBLY

Fig. 1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24

Fig. 2

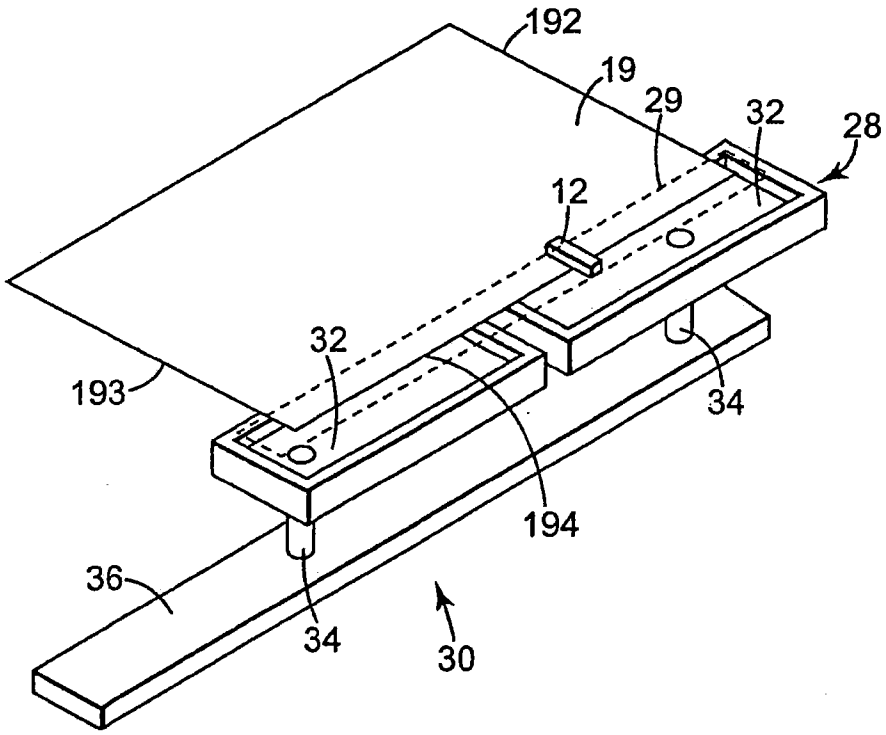

Fig. 3

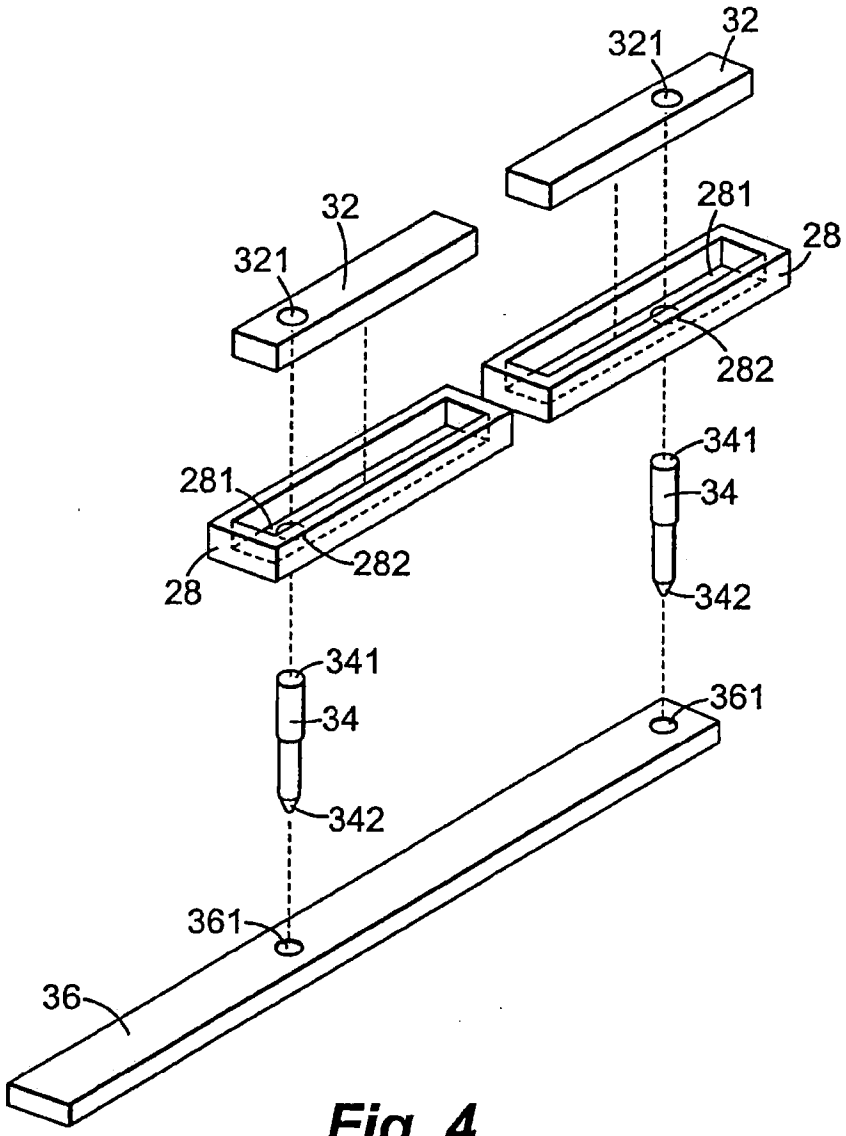

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 25 7047

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	EP 1 234 676 A (CANON KK) 28 August 2002 (2002-08-28) * paragraph [0004] * ---	1-18	B41J2/17 B41J11/00
Y	US 6 337 354 B1 (KATSUMATA YOSHIHIRO ET AL) 8 January 2002 (2002-01-08) * abstract * * column 1, line 37 - column 3, line 42 * * column 5, line 33 - column 6, line 10 * ---	1-18	
Y	US 6 491 371 B1 (BERG RICHARD H ET AL) 10 December 2002 (2002-12-10) * abstract; figures 7-9 * * column 6, line 54 - column 9, line 37 * * claims 1-20 * ---	1-18	
A	EP 0 901 905 A (SEIKO EPSON CORP) 17 March 1999 (1999-03-17) * abstract * * paragraphs [0045]-[0051] * -----	1-18	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	26 April 2004	Callan, F

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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26-04-2004

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 1234676	A	28-08-2002	EP	1234676 A2	28-08-2002
			JP	2002326345 A	12-11-2002
			US	2002158953 A1	31-10-2002
US 6337354	B1	08-01-2002	ID	26734 A	08-02-2001
			JP	2001105630 A	17-04-2001
			US	2002055549 A1	09-05-2002
			JP	2001105622 A	17-04-2001
US 6491371	B1	10-12-2002	BR	0102397 A	13-02-2002
EP 0901905	A	17-03-1999	JP	3467716 B2	17-11-2003
			JP	9039258 A	10-02-1997
			EP	0901905 A2	17-03-1999
			DE	69604615 D1	18-11-1999
			DE	69604615 T2	08-06-2000
			DE	69623500 D1	10-10-2002
			DE	69623500 T2	27-02-2003
			EP	0744294 A1	27-11-1996
			US	6203136 B1	20-03-2001